

9

structural aspect ratio of the wing while maintaining the same stress levels. Utilizing a mid spar or spars may increase the wing aspect ratio further without increasing stress levels.

The slotted cruise wing airfoil and the straight wing allow us to modularize the wing 14 and the body 15, so that we can develop a family of airplanes by intermixing different bodies with different wings.

Aspect Ratio is the ratio of $(\text{span})^2$ divided by wing area. Structural Aspect Ratio is the ratio of $(\text{structural span})^2$ divided by structural wing area.

While preferred embodiments of the invention have been illustrated and described, it will be appreciated that various changes can be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

1. A commercial jetplane capable of flying at a cruise speed of Mach=0.78 or above, comprising:

a fuselage;

a landing gear mounted on said fuselage;

a single wing attached to said fuselage, said single wing being substantially unswept with a high aspect ratio, and including:

a forward airfoil element having an upper surface and a lower surface;

an aft airfoil element having an upper surface and a lower surface;

an internal structure comprising at least two spars extending from one tip to an opposing tip of said single wing, with a rear one of the spars being straight and unswept in plan view;

an airfoil structure having a slot that allows airflow from the forward airfoil element to the aft airfoil element, wherein during cruising flight of the airplane, said airfoil structure having said slot diverts some of the air flowing along the lower surface of the forward airfoil element to flow over the upper sur-

10

face of the aft airfoil element, and where the lower surface of the forward airfoil element and the lower surface of the aft airfoil element are shaped to provide an efficient cross section for a main structural box of the single wing; and

said wing and said fuselage being constructed of at least one of aluminum and graphite composite.

2. The airplane of claim 1 wherein said airfoil structure having a slot produces natural laminar flow over the aft airfoil element of said single wing.

3. The airplane of claim 1 wherein said airfoil structure having said slot produces natural laminar flow over the forward airfoil element of said single wing.

4. The airplane of claim 1 wherein heat is transferred from a leading edge of at least one of said wing and main flap to increase the extent of said natural laminar flow.

5. An airplane of claim 1 which comprises a "T"-tail type empennage.

6. The airplane of claim 1 which comprises a "V"-tail type empennage.

7. The airplane of claim 1 which comprises a low tail type empennage.

8. The airplane of claim 7, wherein at least two high bypass ratio engines are attached to the airframe.

9. The airplane of claim 8 wherein said high bypass engines are geared fan engines or unducted fans which are energy efficient with reduced fuel consumption, noise and greenhouse gas emissions.

10. The airplane of claim 1 wherein the reduced rotation angle also decreases the aft body upsweep and reduces drag.

11. An airplane of claim 1 wherein said single wing is attached to the top of said fuselage and the engines are attached below the wing.

12. An airplane of claim 1 wherein said single wing is attached to the bottom of said fuselage and said engines are attached to the aft end of the fuselage.

* * * * *